

# **Pediatric Constipation**

***By:***

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# Definition



Constipation is difficult passage of hard bowel movements, usually with a decrease in the frequency to  $< 2$  stools per week.

# Infant dyschezia

- Painful defecation with the passage of soft stools.
- Infants strain, cry, and turn red or purple in the face with defecation effort.
- It results from failure to coordinate increased abdominal pressure with pelvic floor relaxation.
- Symptoms persist for 10 to 20 minutes, begin in the first few months of life, and resolve within a few weeks.





# ***Mechanisms***

## **Defective filling of the rectum**

(Ineffective colonic peristalsis  
e.g.hypothyroidism, or  
bowel obstruction)

## **Defective emptying of the rectum**

(Defective defecation  
reflex due to weak  
muscles, spinal cord  
lesions, or pain induced  
sphincteric spasm)

## *Differential Diagnosis of Constipation in Childhood*

### **FUNCTIONAL CONSTIPATION**

- Disorders of intestinal neuromuscular function

### **ANAL AND RECTAL DISORDERS**

- Anal fissure
- Anterior ectopic anus
- Anal stenosis
- Anorectal malformations
- Rectal duplication
- Anal trauma (abuse)
- Pelvic tumor (presacral teratoma, ganglioneuroma, ovarian cyst, hemocolpos)

### **NEUROLOGIC—NEUROMUSCULAR**

- Hirschsprung disease
- Pseudoobstruction syndromes
- Spinal cord lesions
- Spinal dysraphism, including spina bifida
- Cerebral palsy
- Neuromuscular diseases with hypotonia

### **METABOLIC AND ENDOCRINE**

- Hypothyroidism
- Diabetes insipidus

- Hypercalcemia
- Hypokalemia

### **MEDICATION AND TOXIN RELATED**

- Antihistamines
- Anticholinergics
- Anticonvulsants
- Opioids
- Bismuth, aluminum hydroxide
- Tricyclic antidepressants
- Iron preparations (not iron-fortified formulas)
- Plumbism
- Infant botulism

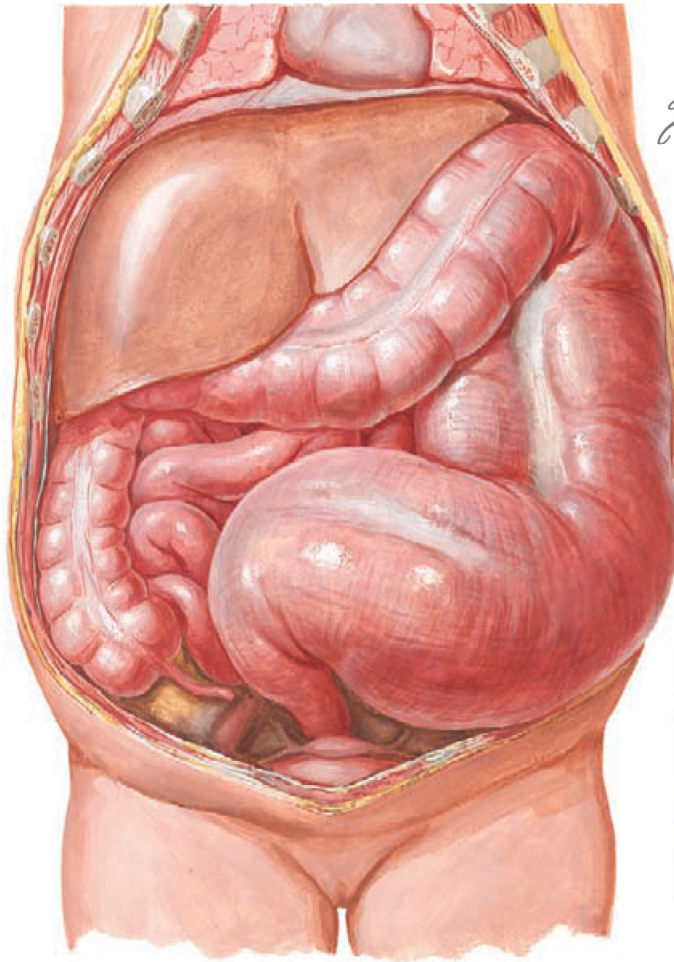
### **MISCELLANEOUS**

- Celiac disease
- Cystic fibrosis
- Cow milk allergy
- Scleroderma
- Systemic lupus erythematosus

## *Red Flags in Childhood Constipation*

- Failure to thrive, weight loss, poor growth
- Vomiting
- Abdominal distention
- Persistent anal fissures, perianal disease
- Persistent blood in stool or guaiac-positive stool
- Delayed passage of meconium
- Weak urinary stream, diurnal enuresis

# Hirschsprung disease



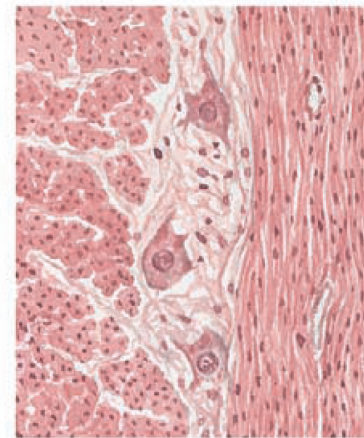
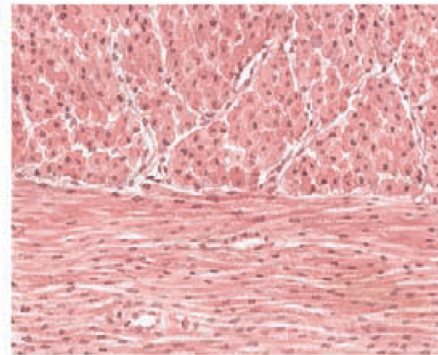
*F. Netter M.D.*

Tremendous distention and hypertrophy of sigmoid and descending colon; moderate involvement of transverse colon; distal constricted segment

Barium enema; characteristic distal constricted segment




Ganglion cells absent



Ganglion cells present between longitudinal and circular muscle layers



# Clues to Hirschsprung disease

- 
- Failure to pass meconium in the first 24 hours of life.
  - Onset of constipation before 3 months of age.
  - Symptoms of intestinal obstruction at any time (distention, emesis).
  - Lifelong dependence on laxatives, enemas, or mechanical manipulation to initiate defecation.
  - History of enterocolitis in early infancy (sometimes misdiagnosed as gastroenteritis).
  - Constipation in children with syndromes associated with Hirschsprung disease (eg, trisomy 21).
  - Failure to thrive or growth faltering.



## Comparison of Hirschsprung Disease to Functional Constipation

CHARACTERISTIC	HIRSCHSPRUNG DISEASE	FUNCTIONAL CONSTIPATION
Prevalence	~1 in 6,000 births	1.5% of 7-year-old boys
Failure to pass meconium <24 hr	58%–94%	~5%
Constipation in first 3 mo	90%	Rare
Symptoms or signs of obstruction	Common	Absent
Abdominal distention	Common	Mild or absent
Stool size	Narrow, ribbon-like	Intermittent large-caliber stools
General appearance	Chronically ill	Well
Stool-withholding behavior	Rare	Extremely common
Soiling	Unusual	Common
Stool in ampulla	Unusual	Common
Plain radiographs	Empty rectum	Dilated enlarged rectum
Rectal manometry	Rectoanal reflex absent	Rectoanal reflex present
Typical barium enema	Distal spasm, proximal dilatation	Diffusely dilated colon and rectum

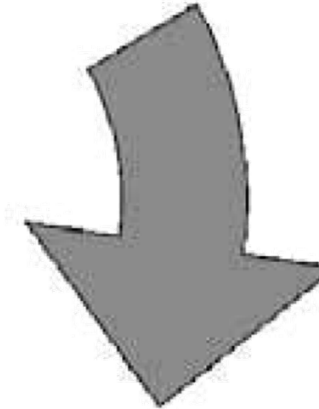
## *Findings That Support the Diagnosis of Functional Constipation*

- Onset after infancy
- Presence of stool-withholding behavior
- Absence of red flags
- Episodic passage of large-caliber stools

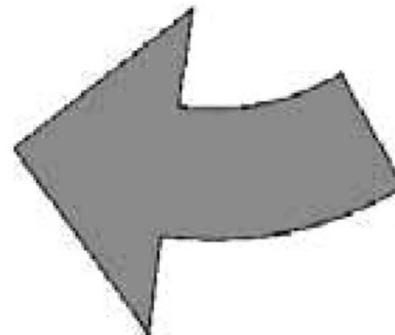
**Painful/  
Unpleasant Experience**



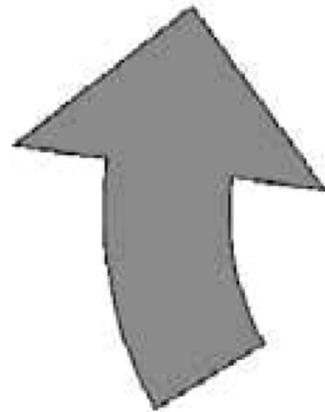
**Stool  
Withholding**

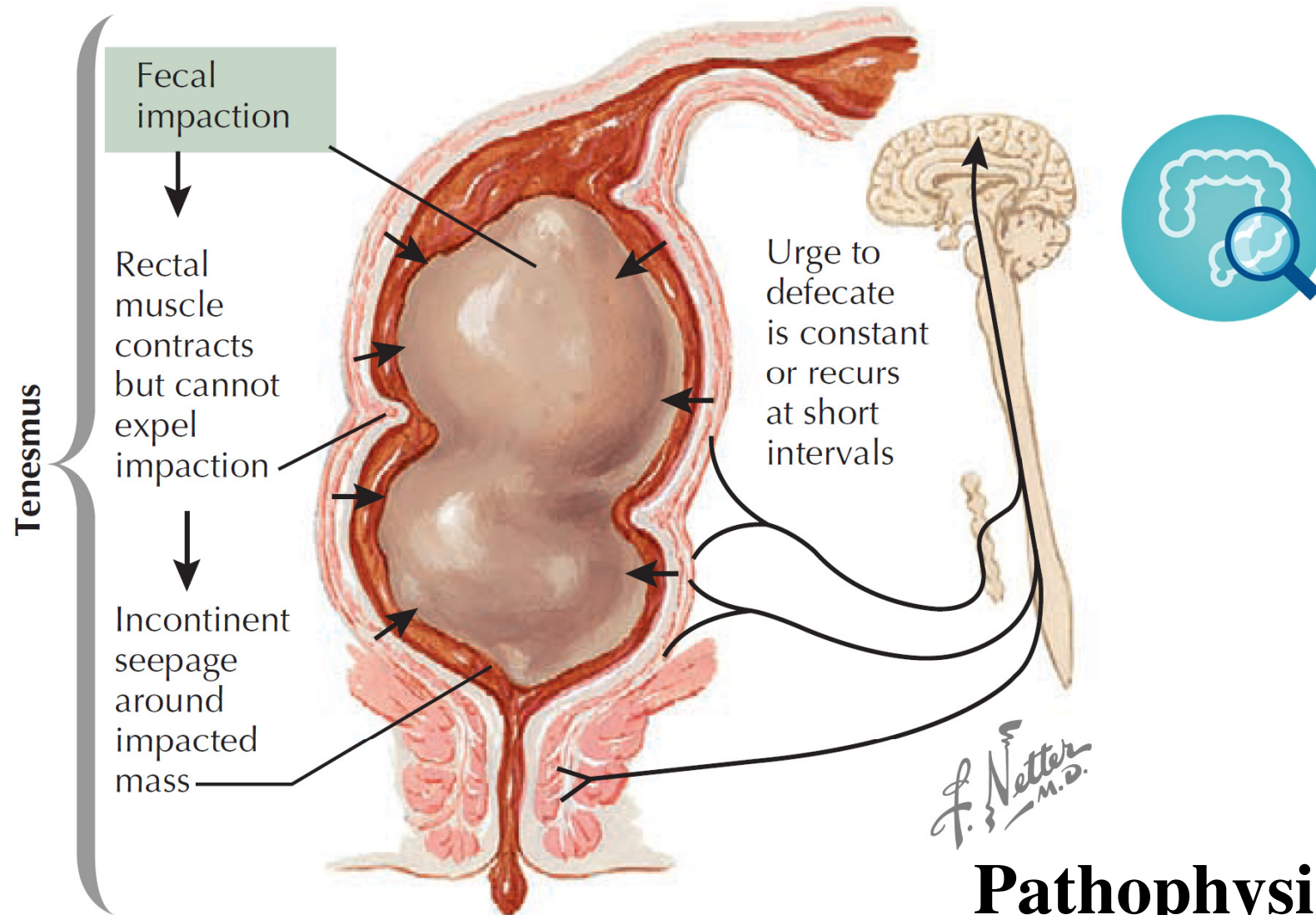


**Rectal  
Dilatation**



**Decreased Sensation/  
Poor Contractility**





## Pathophysiology

Fecal impaction, or a large amount of hard stool in the distal rectum obstructing the anal outlet. The presence of a fecal impaction can lead to encopresis as more proximal fecal matter seeps around the impacted fecal mass.

# Functional constipation

- Persistent, difficult, infrequent, or seemingly incomplete defecation without evidence of underlying structural or metabolic defect.
- Most commonly due to with-holding after a painful bowel movement.
- Presents most commonly at three age periods:
  - At introduction of cereals and solid foods
  - At toilet training
  - At the start of school



# Functional constipation

- Children are described as standing on their toes, stiffening their legs, or hiding in a corner.
- Pain is caused by normal propagating contractions pushing against a closed external anal sphincter.
- Fecal incontinence occurs with sleep, fatigue or attempts at flatus and is occasionally mistaken for diarrhea.
- Physical examination includes assessing the anal tone and presence of stool in the rectal vault by rectal examination.



## **Case study**

A 6-year-old child is brought to the office by her mother who reports 6 months of episodic belly pain. The mother states that the child complains mostly in the afternoon and evening and rarely at night or morning. The pain will last a few minutes and is sometimes severe. She notes that her daughter vomited once and had soiled her underwear on a few occasions. She believes the child toilets daily but has not asked or supervised her directly. The mom reports that the toilet was plugged a few times after the child defecated.



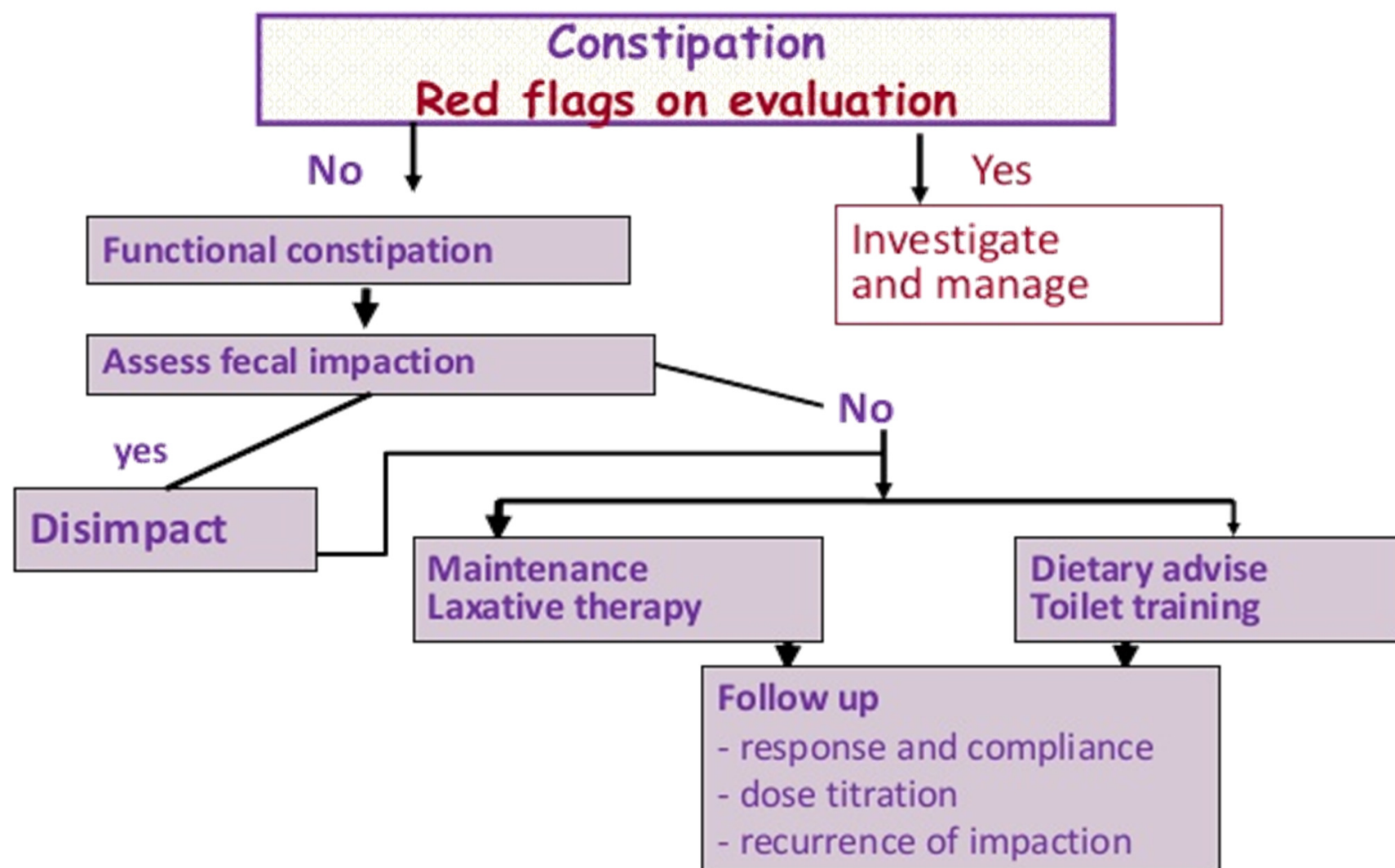
## Case study

The child has a great appetite and eats an age appropriate diet that is high in pastas, breads, cow's milk, and cheese. The child at times is gassy and looks bloated. Otherwise the child is healthy, growing and developing normally, and is in first grade. On examination, vital signs are normal, she is at the 75<sup>th</sup> percentile in height and 90<sup>th</sup> percentile in weight. On questioning the child as to the specific location of her pain, she points to her umbilicus. On deep palpation there is a firm mass in the left lower quadrant; it is non-tender and the abdomen is otherwise soft. A rectal examination reveals hard, dry stool in the vault. The rest of the examination is normal.

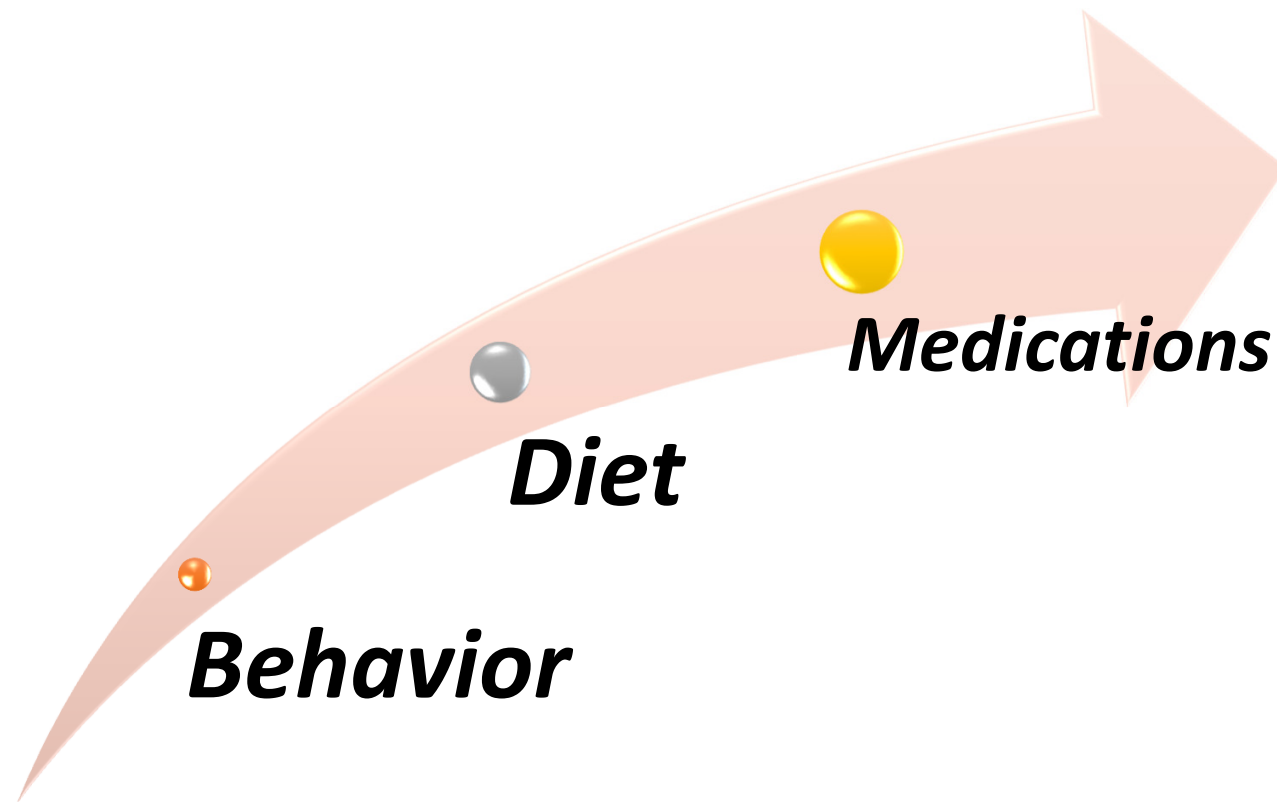
## *Studies in Children With Constipation*

- For growth failure, failure to thrive, short stature
  - Thyroid function tests
  - Celiac panel
  - Sweat test
  - Hirschsprung disease
- For delayed passage of meconium
  - Anorectal manometry
  - Rectal suction biopsy
  - Unprepared contrast enema
  - Sweat test
- For hair tufts, lipomas or hemangiomas overlying the lumbosacral spine and for abnormalities of gait, urination, absence of anal wink or cremaster reflex
  - Consider imaging the lumbosacral spinal cord (ultrasound, magnetic resonance imaging)
- For refractory constipation
  - Thyroid function tests
  - Serum calcium
  - Potassium
  - Lead
  - Celiac panel
  - Sweat test

# Algorithm for evaluation



# Management of functional Constipation



# Behavioral modification

- 1- unhurried toilet sitting for child's age two to three times a day 10-15 minutes after meals (Gastrocolic reflex).
- 2- Sit up straight, Thighs parallel to ground, Good foot support (footstool) is often helpful in maximizing Valsalva maneuver.
- 3- Parents should understand the basic pathophysiology of constipation and be taught to provide consistent positive reinforcement.
- 4- A simple **reward system** such as stickers on a calendar can be effective.



## **Diet modification**

- 1- Increased intake of fluids
- 2- High-residue foods  
(e.g. bran, whole wheat, fruits,  
and vegetables.)



**Fiber Food Reduce Constipation Bloating**

# Diet modification

<i>Avoid/Decrease</i>		
<i>Simple/Processed Carbohydrates</i>	<i>Fat</i>	<i>Meat/Dairy</i>
<ul style="list-style-type: none"><li>• Sugar</li><li>• Corn syrup</li><li>• Soda</li><li>• White bread</li><li>• White rice</li><li>• Pastries/biscuits</li><li>• Pasta/macaroni</li><li>• Potato/corn chips</li></ul>	<ul style="list-style-type: none"><li>• Fried food</li><li>• Saturated fat</li><li>• Trans fat</li><li>• Animal fat</li><li>• Gravy</li><li>• Vegetable oil</li></ul>	<ul style="list-style-type: none"><li>• Processed meat</li><li>• Red meat</li><li>• Ground beef</li><li>• Cold cuts</li><li>• Cow's milk</li><li>• Cheese</li><li>• Cream</li></ul>



# Diet modification

<i>Introduce/Increase</i>			
<i>Fruit/Nectar</i>	<i>Dried Fruit</i>	<i>Vegetables/ Roots</i>	<i>Legumes/Tree Nuts/Seeds</i>
<ul style="list-style-type: none"> <li>• Pears</li> <li>• Plums</li> <li>• Papaya</li> <li>• Peaches</li> <li>• Pineapple</li> <li>• Apples</li> <li>• Berries</li> <li>• Cantaloupe</li> </ul>	<ul style="list-style-type: none"> <li>• Prunes</li> <li>• Raisins</li> <li>• Apricots</li> <li>• Cranberries</li> <li>• Cherries</li> <li>• Dates</li> </ul>	<ul style="list-style-type: none"> <li>• Asparagus</li> <li>• Broccoli</li> <li>• Cauliflower</li> <li>• Carrots</li> <li>• Spinach</li> <li>• Yams</li> <li>• Parsnip</li> <li>• Celery</li> <li>• Beets</li> </ul>	<ul style="list-style-type: none"> <li>• Red beans</li> <li>• Garbanzo beans</li> <li>• Peas</li> <li>• Cashews</li> <li>• Almonds</li> <li>• Walnuts</li> <li>• Pistachios</li> <li>• Sunflower seeds</li> <li>• Flaxseed</li> </ul>

### Box 111-3. Pharmaceutical and Supplement Therapy in Constipation

<i>Osmotic Laxatives</i>	<i>Psyllium Husk</i>	<i>Prebiotics/Probiotics</i>
<ul style="list-style-type: none"> <li>• Polyethylene glycol</li> <li>• Lactulose</li> <li>• Magnesium hydroxide</li> <li>• Phosphate</li> </ul>	<ul style="list-style-type: none"> <li>• Bulking agents</li> <li>• Guar gum</li> <li>• Bran</li> <li>• Calcium polycarbophil</li> <li>• Methylcellulose</li> </ul>	<ul style="list-style-type: none"> <li>• Inulin</li> <li>• Fructo-oligosaccharide</li> <li>• <i>Lactobacillus reuteri</i>, <i>L plantarum</i></li> <li>• <i>Bifidobacterium longum</i>, <i>B animalis</i>, <i>B breve</i></li> </ul>
<i>Lubricant/Detergent</i>	<i>Stimulants</i>	<i>Enemas/Suppositories</i>
<ul style="list-style-type: none"> <li>• Mineral oil</li> <li>• Docusate sodium</li> </ul>	<ul style="list-style-type: none"> <li>• Senna</li> <li>• Bisacodyl</li> </ul>	<ul style="list-style-type: none"> <li>• Phosphate</li> <li>• Saline</li> <li>• Mineral oil</li> <li>• Glycerin</li> </ul>

## Regimens for Older Toddlers and Children Who Have Chronic Constipation<sup>a</sup>

### LAXATIVE DOSAGES

#### DISIMPACTION

Enema	
Hypertonic sodium phosphate <sup>a,b</sup>	3 mL/kg/dose, once daily via rectum for 3–6 days, maximum 135 mL
Mineral oil	30–60 mL, once daily via rectum for 1–6 days
Oral	
Polyethylene glycol, electrolyte free	1.5 g/kg/day, maximum 100 g for 3–6 days
Mineral oil	30 mL/year of age to maximum 8 oz twice daily for 3 days
Polyethylene glycol with electrolytes	10–40 mL/kg/hr, via nasogastric tube (maximum 2 L/hr) until stool effluent clear

#### MAINTENANCE

Polyethylene glycol, electrolyte free powder	0.8–1.5 g/kg/day
Mineral oil	1–3 mL/kg/day
Milk of magnesia	1–3 mL/kg/day
Lactulose 10 g/15 mL	1–2 mL/kg/day
Senna syrup 218 mg/5 mL <sup>b</sup>	10–20 mg/kg/dose po qhs

<sup>a</sup>Not recommended for children younger than 2 years of age.

<sup>b</sup>See maximum doses in the *Physicians' Desk Reference*.

